Source Protection: You Can Do This!

Paul Susca
NHDES Drinking Water Source Protection Program

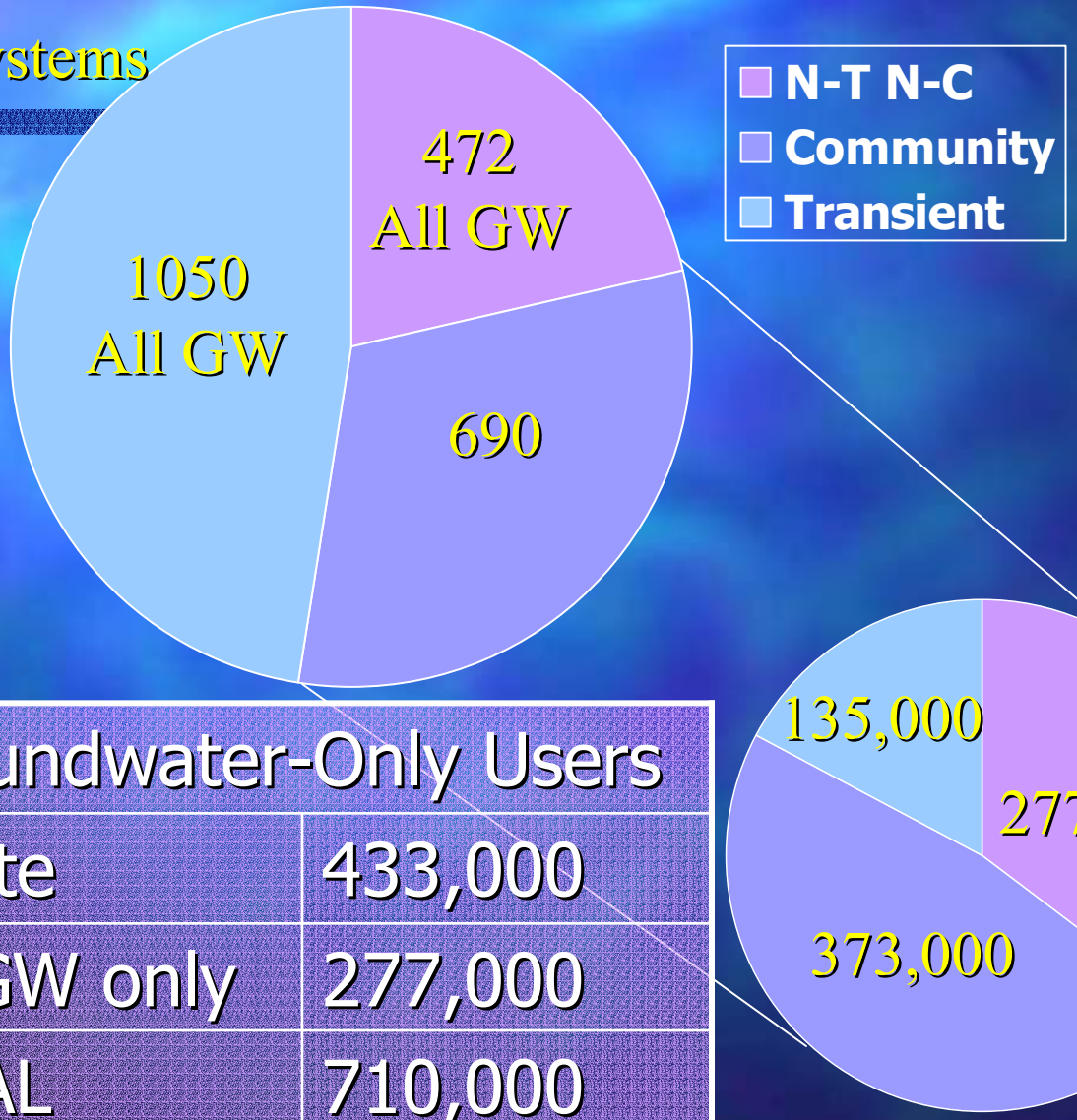
You Can Do Source Protection

- One size fits most.
- Everyone can be better than average.
- Learn from one another.

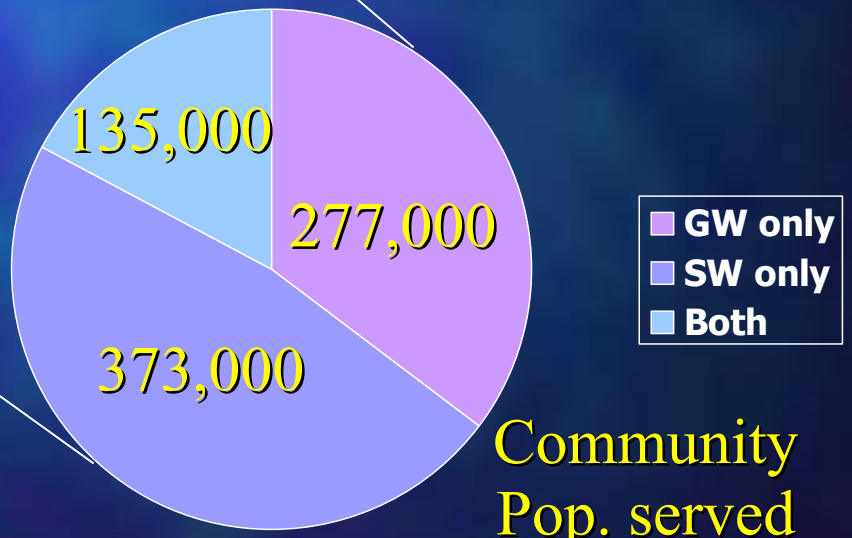
Source Protection

- Public Water Systems
  - Groundwater sources
  - Surface water sources
- Private Wells (all groundwater)

NH Public Water Systems



Groundwater-Only Users	
Private	433,000
C – GW only	277,000
TOTAL	710,000



Source Protection Steps

1. Education: why, what, how, who
2. Stakeholder Participation
3. Identify Resources to be Protected
4. Inventory Current and Future Threats
5. Decide on Protection Approaches (Plan)
6. Implementation
7. Education

Pre-Kickoff Public Education

Northeast Rural Water Association
187 Saint Paul Street
Burlington, Vermont 05401

A Community Effort to Protect Water Quality

The Town of Meredith is embarking on an exciting watershed protection effort. The purpose of this project is to protect water quality in the Waukewan Watershed. The watershed spans areas of Ashland, Center Harbor, Holderness, Meredith, and New Hampton. This watershed includes water bodies such as Lake Waukewan, Lake Winona, Hawkins Pond, the Snake River and a multitude of streams and tributaries. These lakes serve as important habitat for aquatic species, provide important economic value to the region, and Lake Waukewan serves as the primary public drinking water source for the Town of Meredith.

Although the lakes are still in a relatively healthy condition certain ecological indicators suggest that human activity is starting to effect water quality. Without planning for the future, the water quality of these lakes is

By dev
WATERSHE
water quality
generations.

What is

A wate
land area th
specific body
Watershed is

as the drainage system for Lake Waukewan and Lake Winona. Using a watershed

What are the steps To protecting the Watershed ?

1. Form a Steering Committee.
2. Identify possible sources of pollution in the watershed.
3. Prioritize threats.
4. Propose ways to manage threats.
5. Seek public input and participation.
6. Incorporate information from items 2-5 into a plan.
7. Implement the Plan!

.

How to become involved

Help work on the plan by:

- Serving on the Steering Committee
- Participating in Focus Groups
- Attending watershed protection meetings
- Help identify land uses and possible sources of contamination
- Help educate the public

How to Protect Water Quality

- Recognize and manage possible sources of contamination.
- Use hazardous products as directed and dispose of them properly.
- Conserve water.

For more information contact:

John Edgar, Town Planner
(603) 279-4538
jedgar@meredithnh.org

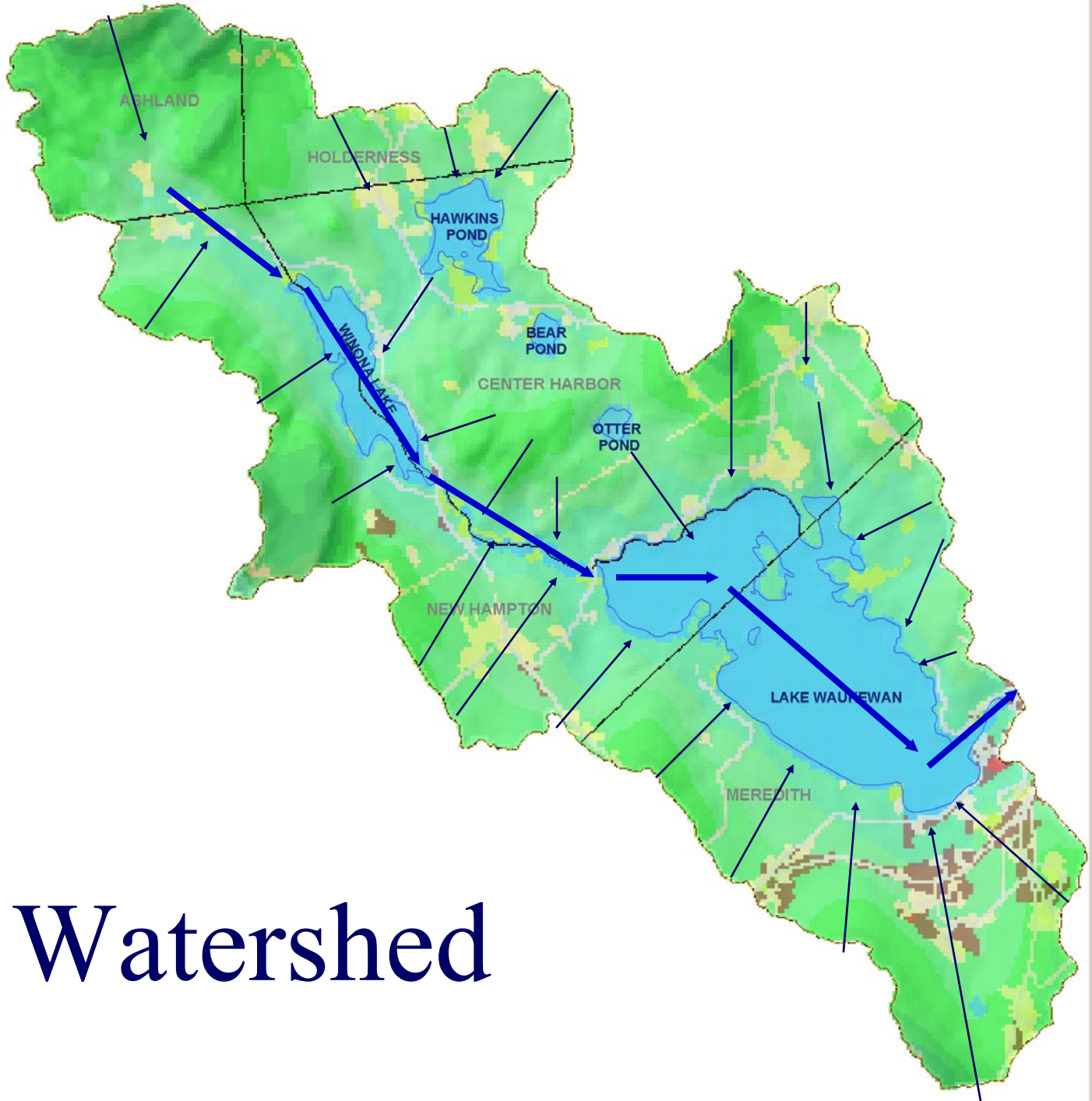
Jennifer Palmiotto,
Source Water Specialist
1 800 55 NERWA ext 325
jpalmiotto@neruralwater.org

2. Stakeholder Participation

- Time consuming
- Worth the effort:
  - Fewer surprises
  - Workable plans
  - Implementation success

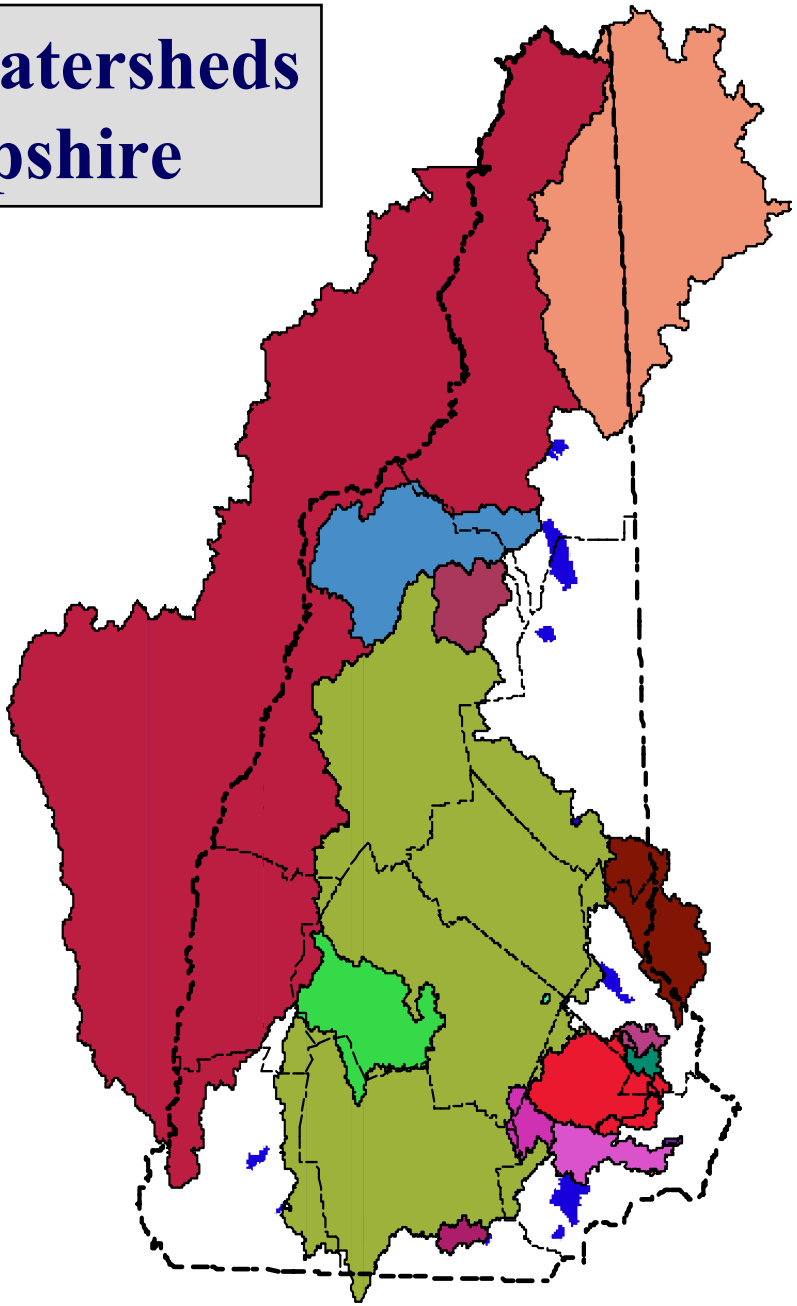
3. Resources to be Protected

- Groundwater
  - Wellhead Protection Areas
  - Stratified-Drift Aquifers
  - All Groundwater
- Surface Water
  - Watershed(s)
  - Buffers


ASHLAND
HOLDERNESS
HAWKINS POND
BEAR POND
WINONA LAKE
CENTER HARBOR
OTTER POND
NEW HAMPTON
LAKE WAUKEWAN
MEREDITH

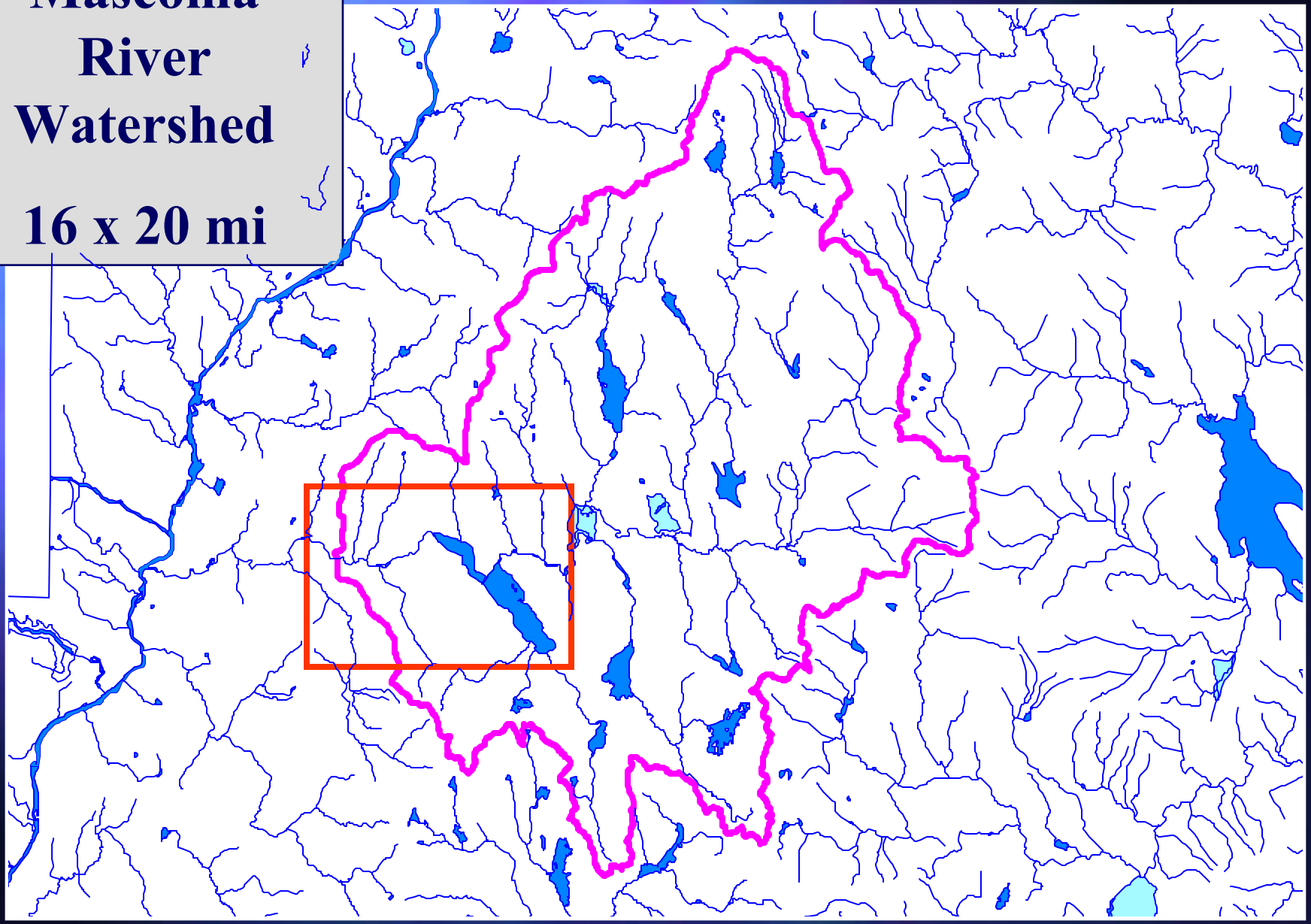
Watershed

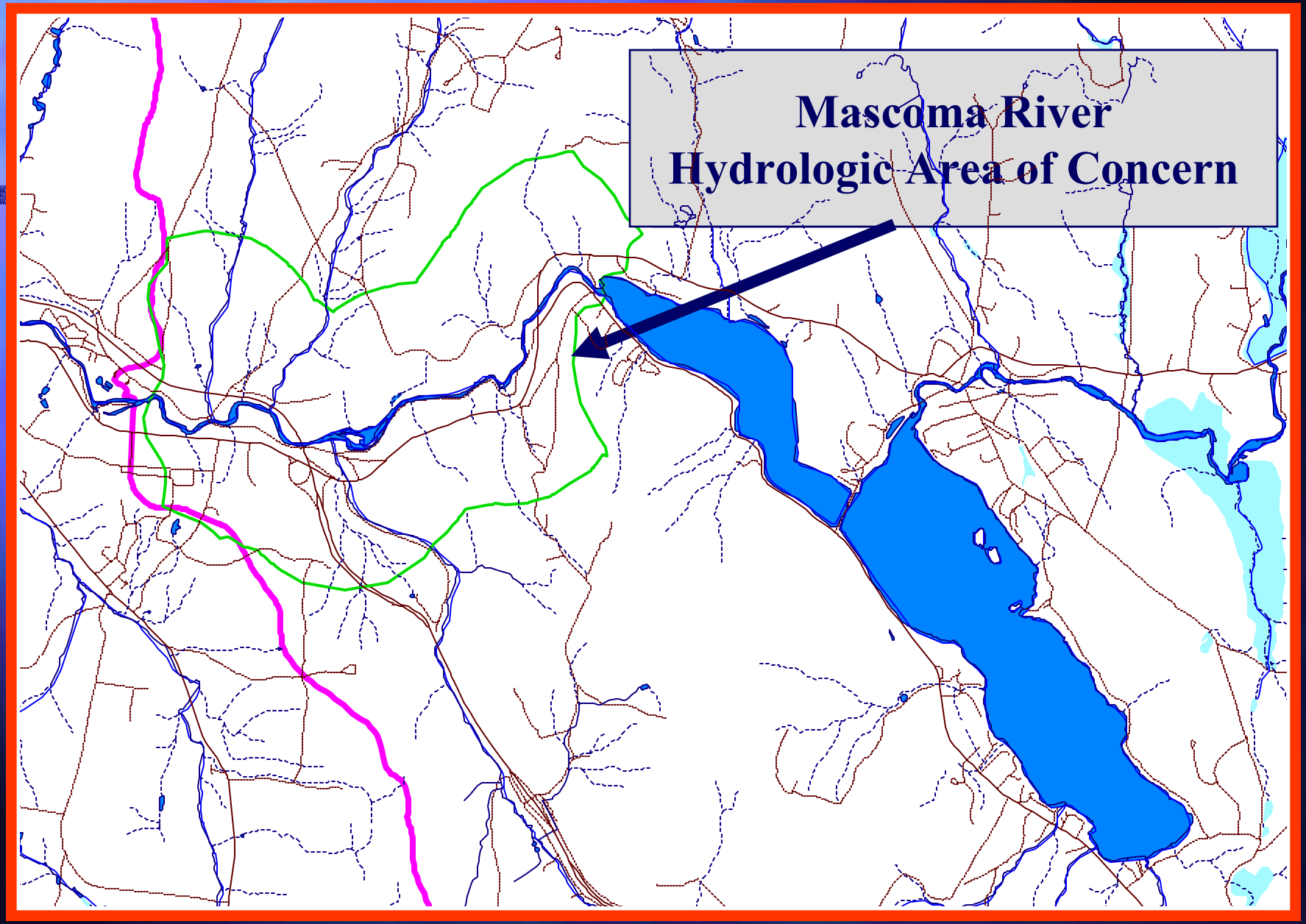
Water Supply Watersheds In New Hampshire



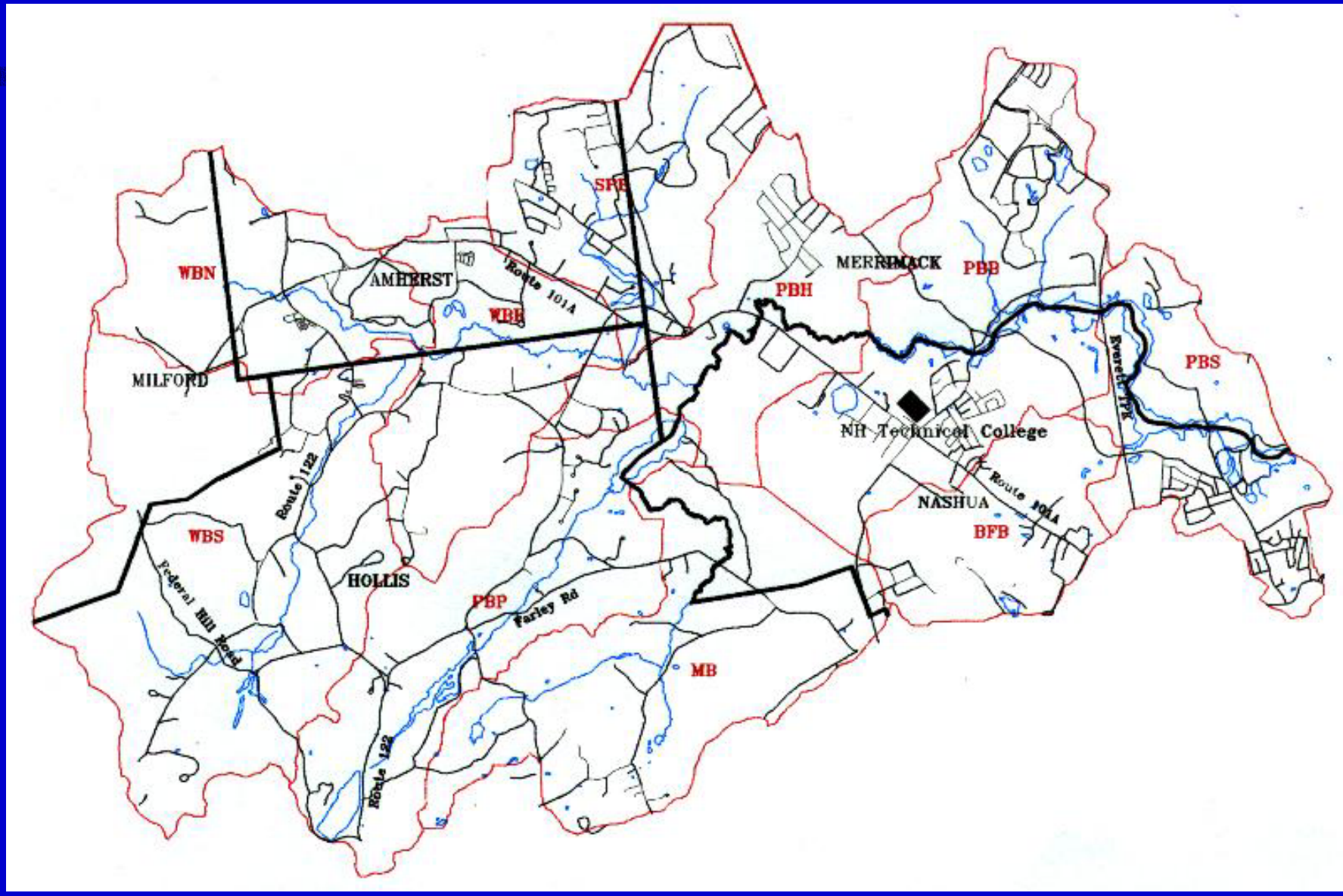
Mascoma River Watershed

16 x 20 mi

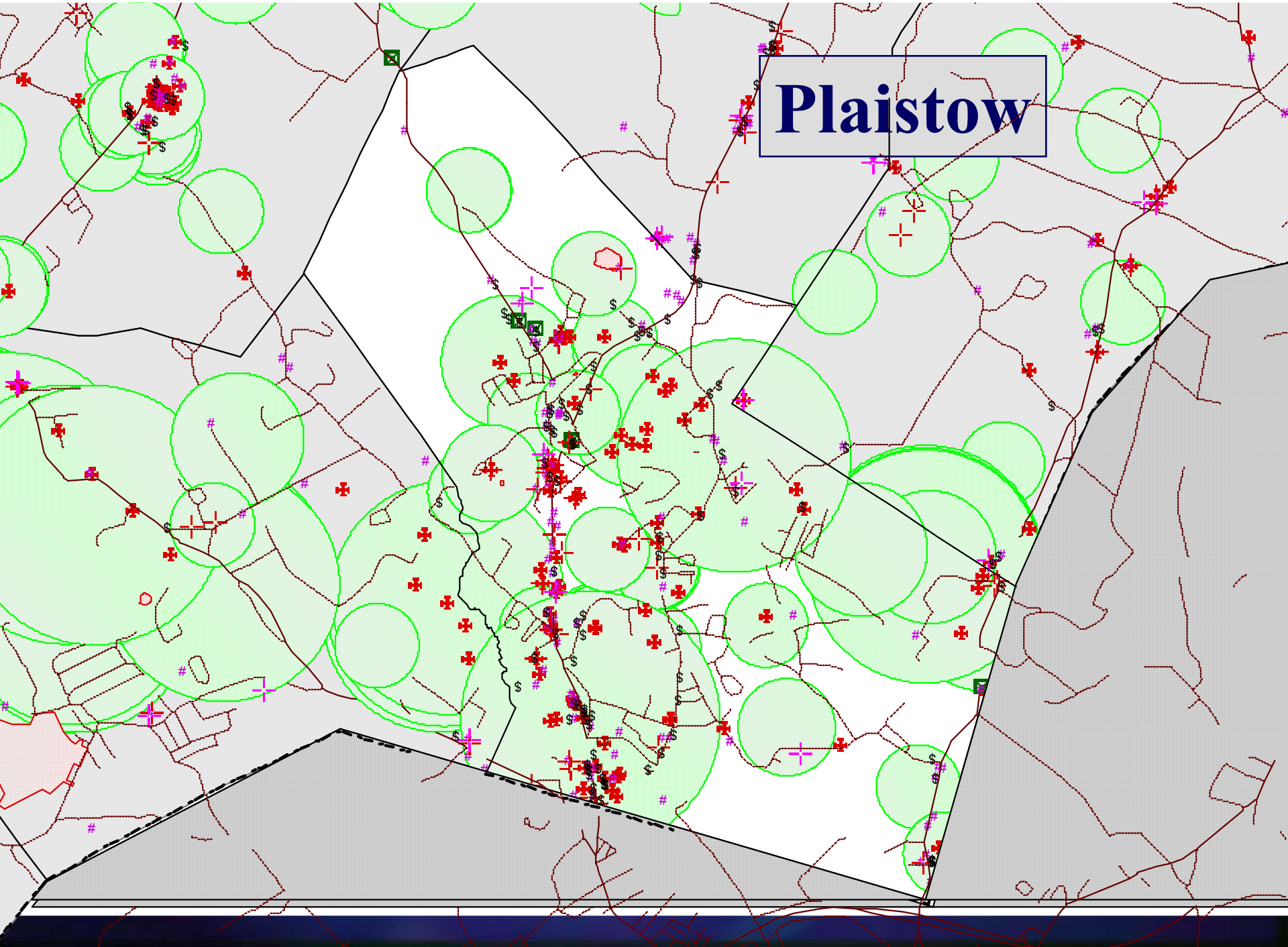


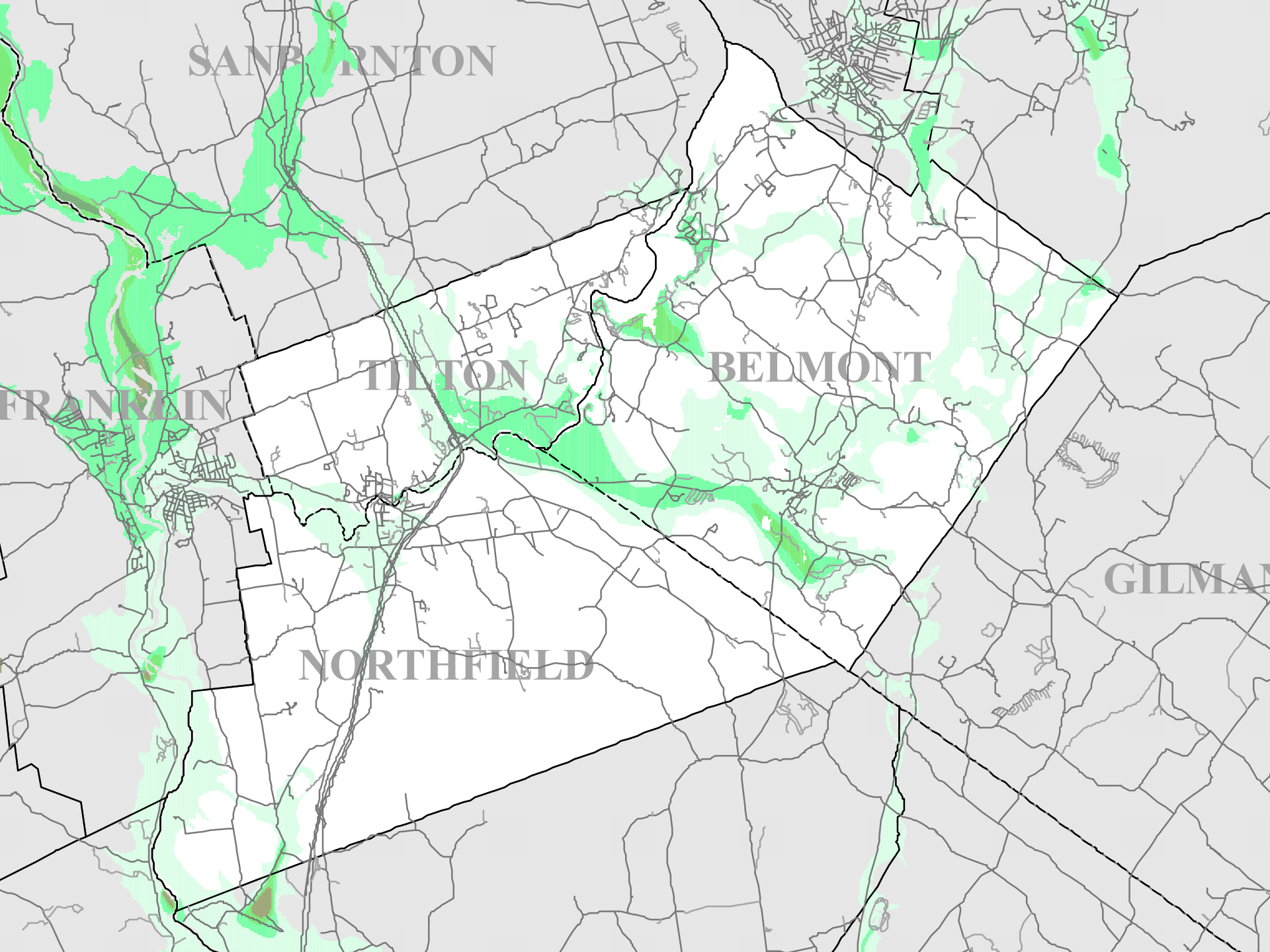

Mascoma River
Hydrologic Area of Concern

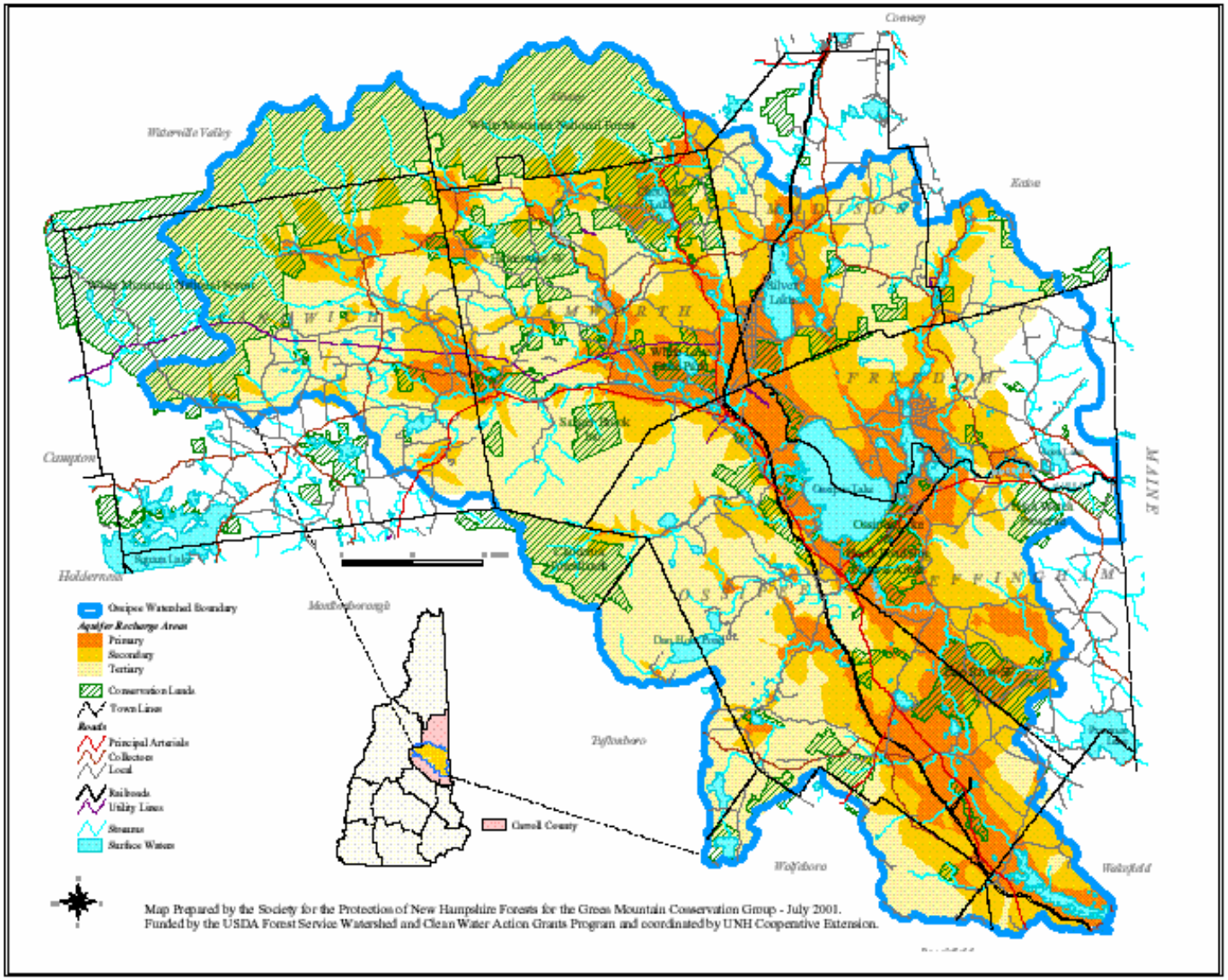
Pennichuck Brook Watershed Management Plan
Sub-watersheds




Wellhead Protection Area


Plaistow


TILTON
BELMONT
NORTHFIELD



Ossipee Watershed

STRATIFIED DRIFT AQUIFER

Stratified-drift aquifers consist mainly of layers of sand and gravel, parts of which are saturated and can yield water to wells or springs. The sand and gravel deposits found in the Ossipee Watershed were deposited by water from melting glaciers. These aquifers are high yield aquifers that can recharge quickly with rainwater, but are also vulnerable to easy contamination. The largest and deepest stratified drift aquifer in New Hampshire is in the Ossipee River Basin.

AQUIFER RECHARGE AREAS

The water quality of an aquifer depends on many things including the size and location of the aquifer's recharge areas. Even more important is the location of these recharge areas in relation to land use and potential contamination sources.

This map identifies and groups the aquifer recharge areas into three classes: primary, secondary, and tertiary.

Primary recharge areas occur where the aquifer materials are exposed at the land surface. Because water infiltrates directly into the aquifer, protection efforts are particularly important here.

Secondary recharge areas are zones adjacent to the aquifer. Water that enters these zones eventually recharges the aquifer either through surface runoff or through groundwater flow.

Tertiary recharge areas are zones that supply water to streams that flow across the primary recharge area. Water entering the tertiary recharge area may or may not enter the aquifer depending on water levels.

DATA SOURCES

Aquifer recharge data was provided by Dr. Robert Newton of the Smith College Spatial Analysis Lab in June 2001. All other data displayed here represents stock data sets obtained from the NH GRANIT database as maintained by the Complex Systems Research Center at the University of New Hampshire.

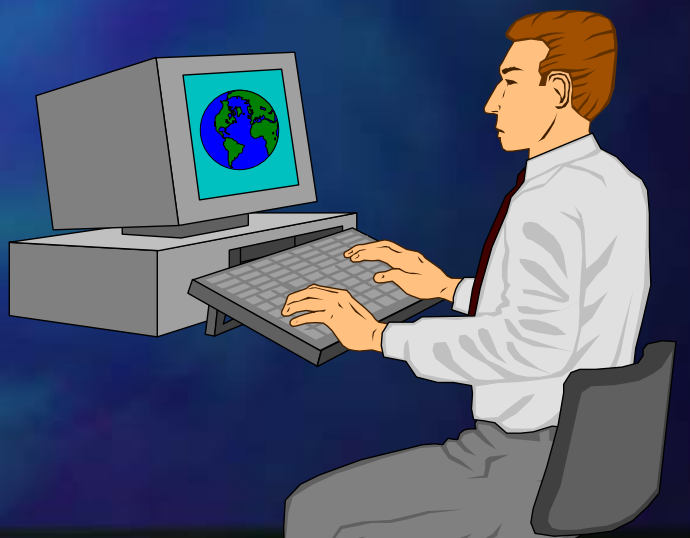
The New Hampshire Geographically Referenced Analysis and Information Transfer System (NH GRANIT) is a cooperative project to create, maintain, and make available a statewide geographic data base serving the information needs of state, regional, and local decision-makers.

4. Inventory

- Existing/Potential Threats
  - PCSs
  - Septic systems
  - Agricultural land use
  - Nonpoint sources
  - Recreation
- Future Threats
  - Residential build-out
  - Non-residential land uses
  - Increased recreation

Geographic Information System
component of inventory

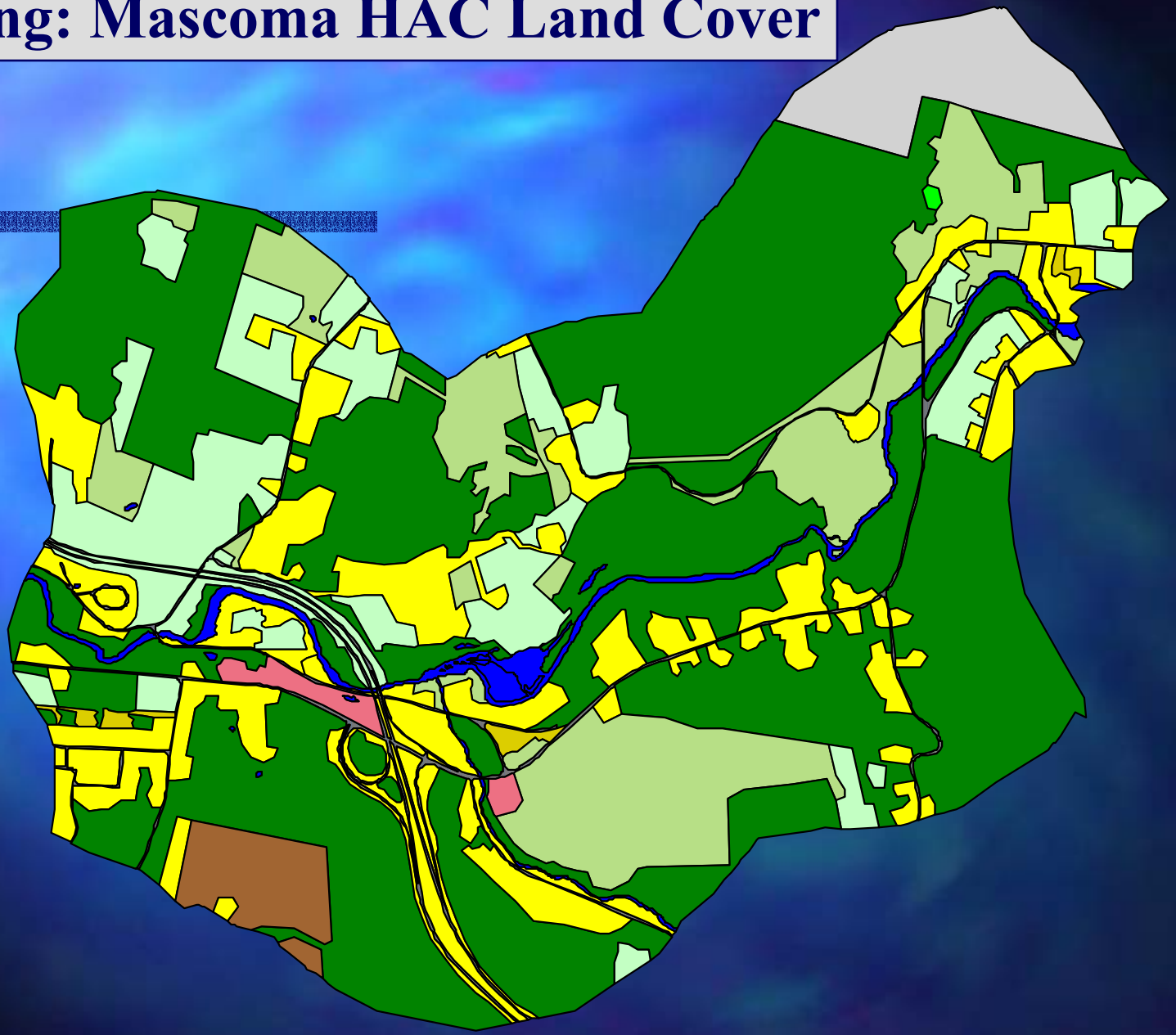
- Known sources of contamination (Superfund, LUST, spill sites)
- Highways and railroads
- Pesticide application areas
- Sewer lines
- Urban land cover
- Agricultural land cover



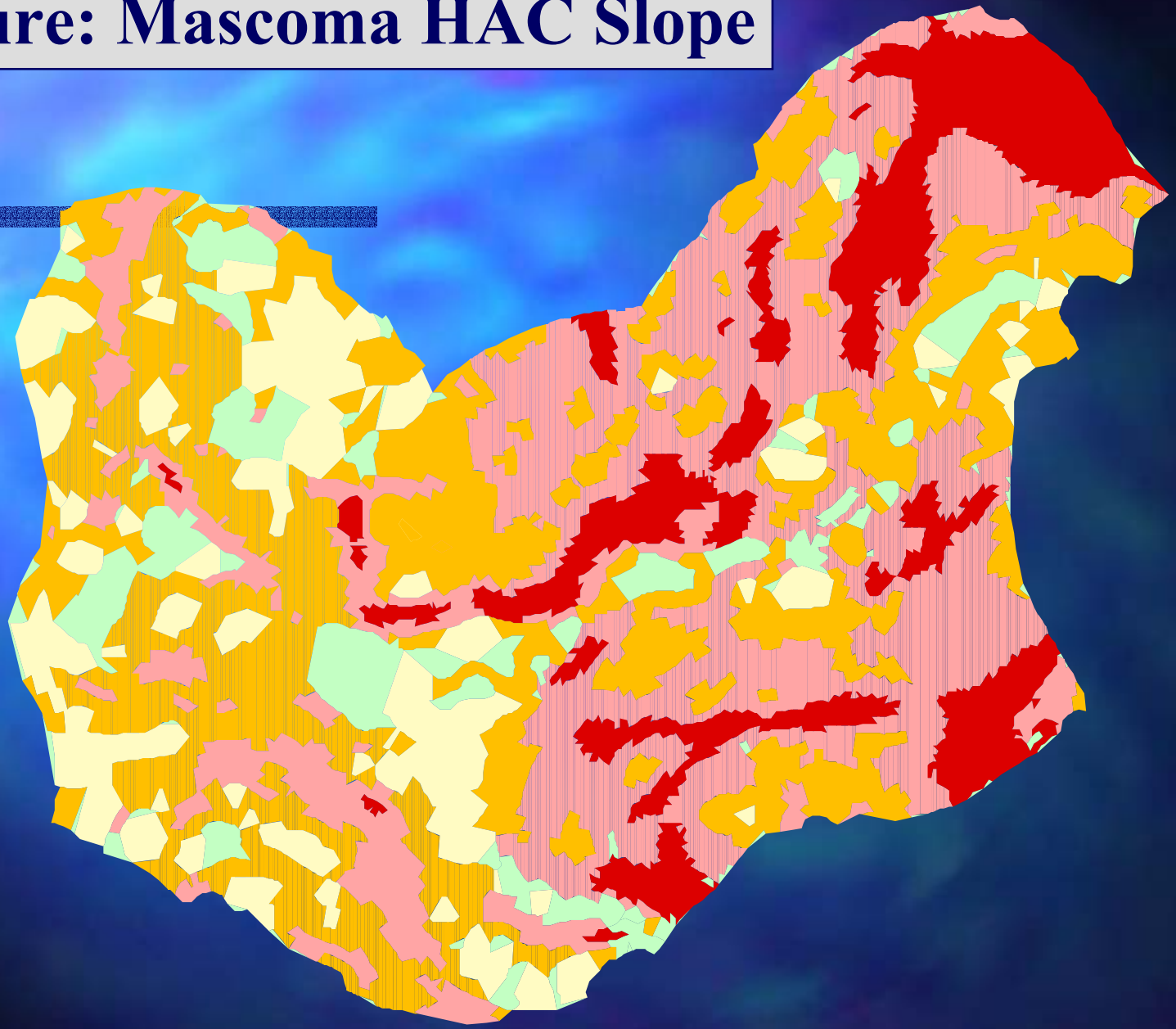
Windshield Surveys

- Potential VOC/SOC
  - Storage tanks
  - Concrete, asphalt
  - Auto dealerships
  - Cemeteries
  - Cleaning facility
  - Construction sites
  - Earthmoving
  - Food processing
  - Service & repair
  - Junkyards
  - Haz waste generators
- VOC/SOC continued
  - Sludge piles, lagoons
  - Spray irrigation
  - Laboratories
  - Lined landfills
  - Wastewater lagoons
  - Manufacturing
  - Metal-working
  - Infiltration basins
- Septic systems
- Dense development
- Animal farms

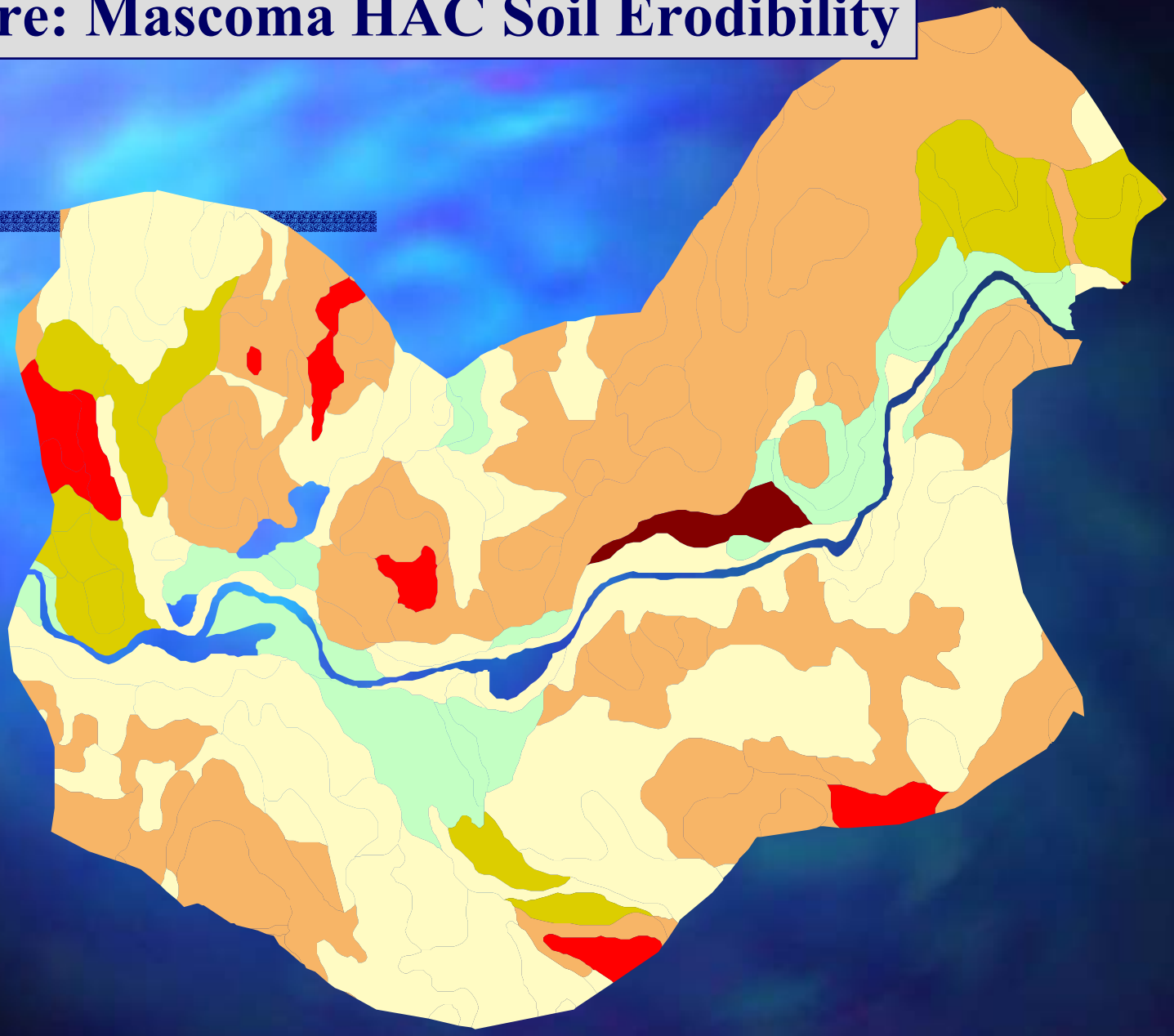
Existing: Mascoma HAC Land Cover



Future: Mascoma HAC Slope



Future: Mascoma HAC Soil Erodibility



Future: Mascoma HAC WQ Threats


Lake Massabesic
• Protected shoreline
• Road crossings
• Body contact
• Urbanization

Bellamy Reservoir

- Protected shoreline
- Recreation restrictions
- Thin ice?

Keene Water Supply Watershed

- Undeveloped
- Recreation Concerns

5. Protection Approaches

- Non-regulatory
  - Land protection
  - Public education
  - Outreach to businesses
  - Voluntary inspection
  - Nonpoint Best Management Practice$
- Regulatory
  - Zoning, etc. (local)
  - Groundwater BMPs (state and/or local)
  - Watershed rule (DES)

Non-Regulatory Management: Education

- Youth education
  - School visits
  - DES teaching materials & training
  - Water festival
- General public
  - Signs
  - Fliers to customers, WHPA residents
- Potential polluters
  - Best management practices "visits"
  - Watershed "patrol"


EMERGENCY EXIT
Children's Water Festival
First Week of May

Protecting Shared Drinking Water Resources

A Collaborative I

This project was developed based on community interest in the preservation of the quality and quantity of existing and potential future drinking water supplies through aquifer protection measures. The Water Resources Committee, composed of community representatives, participated in the many components of this project and contributed extensive knowledge of town-specific concerns and issues. Planning assistance was provided by the Lakes Region Planning Commission (LRPC). The communities are now beginning to implement key project recommendations as a continued effort to protect the stratified drift aquifer as a drinking water resource. This brochure summarizes the project. Funding provided by a Source Water Protection Grant from the New Hampshire Department of Environmental Services (NHDES) and the Lakes Region Planning Commission.

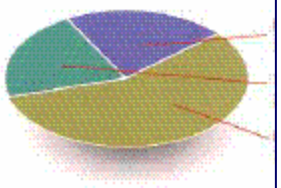
Direct Recharge Area of Stratified Drift Aquifer

As you read through the following information on

Source: Stratified Drift Aquifer data developed by the U.S. Geological Survey in cooperation with NHDES Water Division, Feb

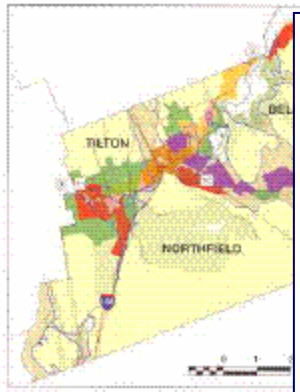
This water found stored in the aquifer is replenished (called "recharged") when rain and snowmelt soaks into the ground and moves down through the soil to the saturated area below the water table, rather than evaporating or running off surface waters. The total area of the three towns is 46,550 acres, and approximately 24% of the total acreage is located within the direct recharge area of the aquifer, which is the area which lies directly over the stratified drift deposit. Land use activities that take place in the direct recharge area have the potential to impact groundwater quality and quantity.

Direct Recharge Area by Town



Total Direct Recharge Area = 11,108.32 a

Source: Stratified Drift Aquifer data developed by the U.S. Geological Survey in cooperation with NHDES Water Division, Feb



Stratified Drift Aquifer and Zoning

The map above depicts the aquifer, the road network, and current zoning of the three towns.

- A large portion of the major roads of the three towns, including I-93, Route 140, and Route 3/11, are within the direct recharge area.
- Average Annual Daily Traffic counts provided by the New Hampshire Department of Transportation show that the numbers of people utilizing the road network have increased from 1995 to 2001.

Source: Average Annual Daily Traffic for Belmont, Northfield, and Tilton, New Hampshire. Department of Transportation, Bureau of Transportation Statistics, 2002

The layout of the roads influences access to property and how zoning is laid out in the three communities. The map displays the current zoning maps of the three towns and the aquifer area. As shown on the map, there is a mixture of commercial and/or industrial in the area of the aquifer, which follows along the major roadways.

- In total, 29.2% of the total direct recharge area is within a commercial and/or industrial zone.
- Although only 29.2% of the total direct recharge area has some form of commercial and/or industrial, the area with the highest of the three categories of intensity is zoned for some form of commercial and/or industrial. This has implications for the availability of future drinking water supply sources.

The zoning ordinances of the three towns identify where potential uses might take place in delineated districts. To gain a clearer picture of potential land uses in the recharge area, a complete review of the current zoning ordinances and regulations of each town was conducted. This is detailed in the project report.

Reductions in Recharge

The natural ability of precipitation to enter the ground, move through the soil to the water table, and contribute to the aquifer can be interrupted when land is paved or other surfaces which don't allow water to enter the ground are placed over the direct aquifer recharge area. Cement, asphalt, roofing, and other materials that prevent precipitation and runoff from entering the ground are known collectively as impervious surfaces. Impervious surfaces can lead to reductions in the recharge of groundwater by allowing precipitation to evaporate off their surface or to be diverted away from the area where water entering the ground would recharge the aquifer. Not only do impervious surfaces inhibit the recharge of groundwater, but they also provide a surface for the accumulation of pollutants, prevent the natural processing of pollutants by plants and soil, and create a direct route for pollutants to enter surface water in some cases.

In the case of impervious surfaces, a balance needs to be found between the reductions in recharge caused by impervious surfaces and the benefits of impervious surfaces in certain cases in preventing contamination from entering the ground and potentially contaminating the aquifer resource.

Examples where the use of impervious surfaces might be warranted to prevent groundwater contamination: to properly store regulated substances and road salt; to contain hazardous substances and to prevent contamination in the case of an accidental spill; and to redirect polluted stormwater runoff through stormwater management systems designed following Best Management Practices to ensure that clean water is recharged to the aquifer.

Detailed information on impervious surfaces can be found in the project report.

Common Vision

The towns of Belmont, Northfield, and Tilton are very fortunate, in regards to our existing and potential future needs for drinking water, to be located on a large stratified drift aquifer. Water is the most basic of resources, and the three towns have a great responsibility to assure that we preserve water quality and conserve water quantity for future generations. Each of our towns recognizes that we share this valuable resource and agree that there is the need for continued collaborative drinking water resource planning. In order for one town's efforts to be effective, they must be complemented by actions in each of the other towns. Thoughtful planning which works to balance economic growth with groundwater protection will assist our towns in maintaining the viability of common drinking water resources into the future.

Developed by the Water Resources Committee as a common vision for the protection of the aquifer for the three towns.

To learn more about this project, copies of the following are available in each town hall and at LRPC:

Project Report: The project report provides the three towns with a comprehensive assessment of their stratified drift aquifer resources, including exploring potential threats to the quality and quantity of present and potential drinking water sources and providing recommendations for addressing the most significant threats. This report includes maps, charts, tables, and extensive information regarding drinking water resources.

Implementation Strategies Binder: The implementation strategies binder was developed to assist the communities in implementing the recommendations determined to be of the highest priority to the protection of the aquifer.

Large Format Potential Contamination Sources Map: The large format map provides a higher level of detail than the 11 by 17 version of this map found in the project report.

This four-page summary provides an overview of the project and the contents of the report. Additional copies of this summary are available in each Town Hall and at the Lakes Region Planning Commission.

How Can I Get Involved?

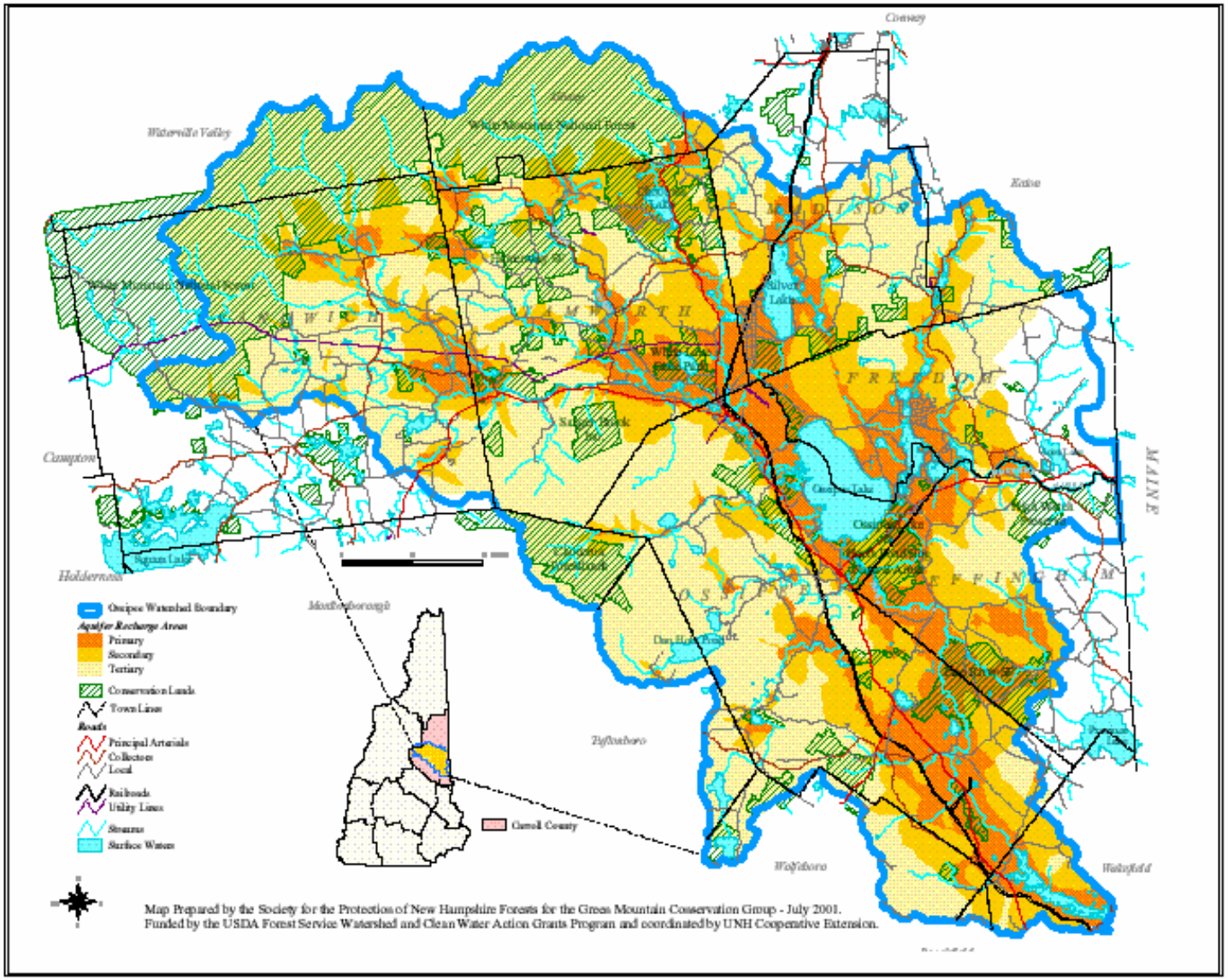
To learn more about project implementation, please contact the Planning Department, Planning Board, and/or Conservation Commission of Belmont, Northfield, or Tilton for additional information.

If you're interested in learning more about this project or the contents of the report, please contact:

Lakes Region Planning Commission (LRPC)
103 Main Street, Suite No. 3
Meredith, NH 03253
(603) 279-8171

If you would like information on statewide efforts to protect groundwater and drinking water, please contact:

New Hampshire Department of Environmental Services (NHDES)
Drinking Water Source Protection Program
PO Box 95, 6 Hazen Drive
Concord, NH 03302
(603) 271-1168



Ossipee Watershed

STRATIFIED DRIFT AQUIFER

Stratified-drift aquifers consist mainly of layers of sand and gravel, parts of which are saturated and can yield water to wells or springs. The sand and gravel deposits found in the Ossipee Watershed were deposited by water from melting glaciers. These aquifers are high yield aquifers that can recharge quickly with rainwater, but are also vulnerable to easy contamination. The largest and deepest stratified drift aquifer in New Hampshire is in the Ossipee River Basin.

AQUIFER RECHARGE AREAS

The water quality of an aquifer depends on many things including the size and location of the aquifer's recharge areas. Even more important is the location of these recharge areas in relation to land use and potential contamination sources.

This map identifies and groups the aquifer recharge areas into three classes: primary, secondary, and tertiary.

Primary recharge areas occur where the aquifer materials are exposed at the land surface. Because water infiltrates directly into the aquifer, protection efforts are particularly important here.

Secondary recharge areas are zones adjacent to the aquifer. Water that enters these zones eventually recharges the aquifer either through surface runoff or through groundwater flow.

Tertiary recharge areas are zones that supply water to streams that flow across the primary recharge area. Water entering the tertiary recharge area may or may not enter the aquifer depending on water levels.

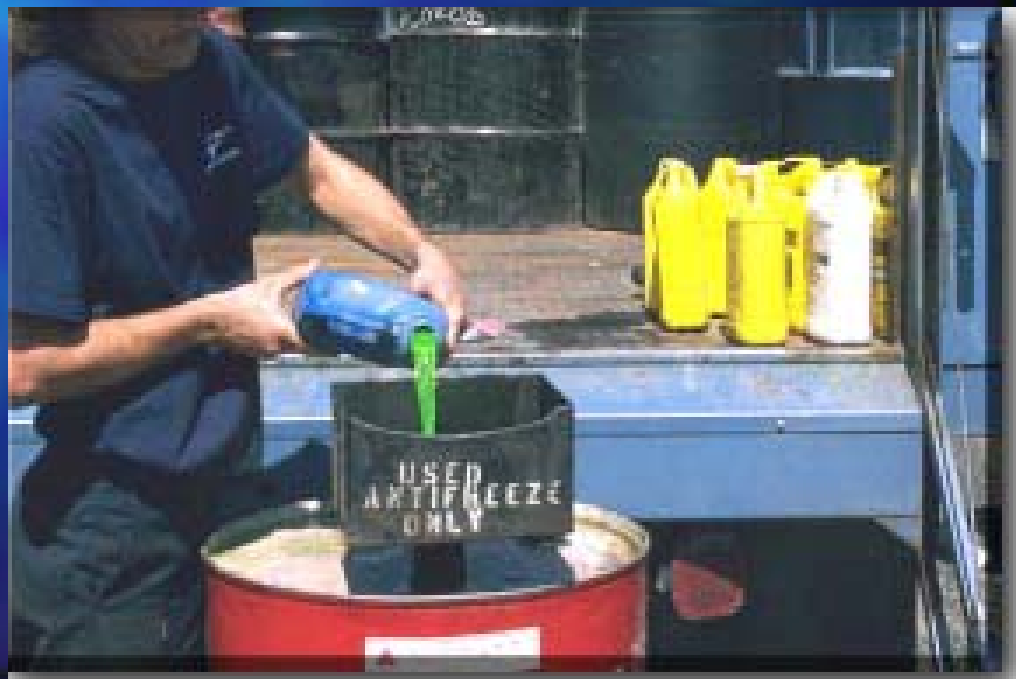
DATA SOURCES

Aquifer recharge data was provided by Dr. Robert Newton of the Smith College Spatial Analysis Lab in June 2001. All other data displayed here represents stock data sets obtained from the NH GRANIT database as maintained by the Complex Systems Research Center at the University of New Hampshire.

The New Hampshire Geographically Referenced Analysis and Information Transfer System (NH GRANIT) is a cooperative project to create, maintain, and make available a statewide geographic data base serving the information needs of state, regional, and local decision-makers.

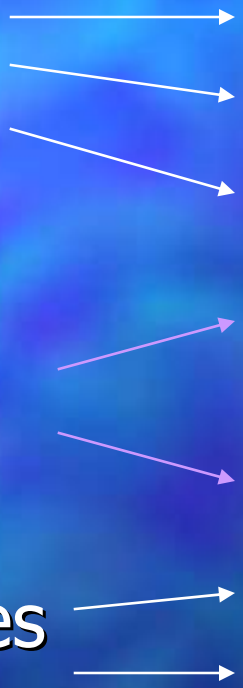
Best Management Practices (BMPs) for Hazardous Substances

- Required statewide
- Local monitoring for compliance
- Common-sense practices
  - Storage
  - Handling
  - Discharges
- DES training

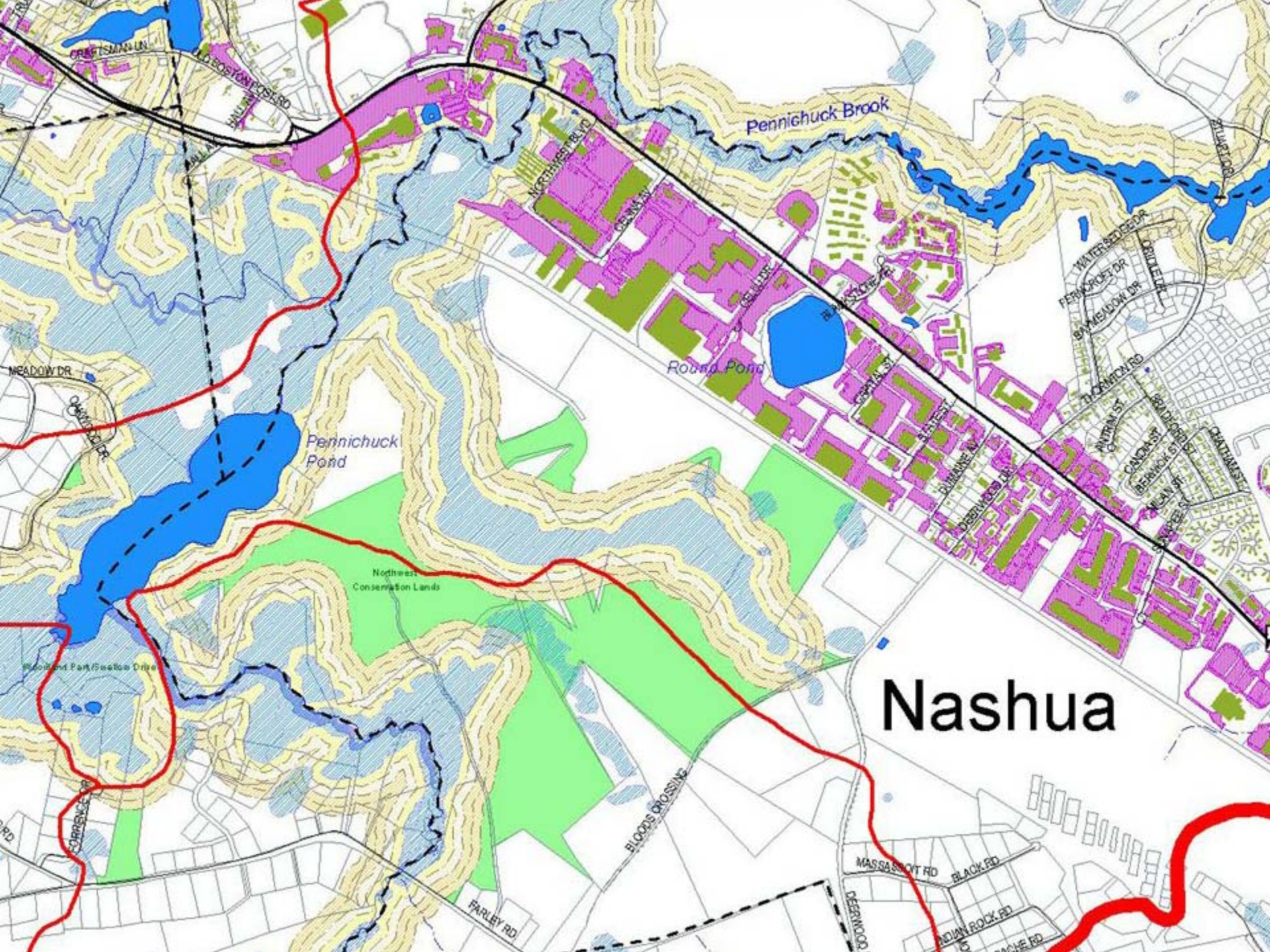


Management Approaches: Regulation

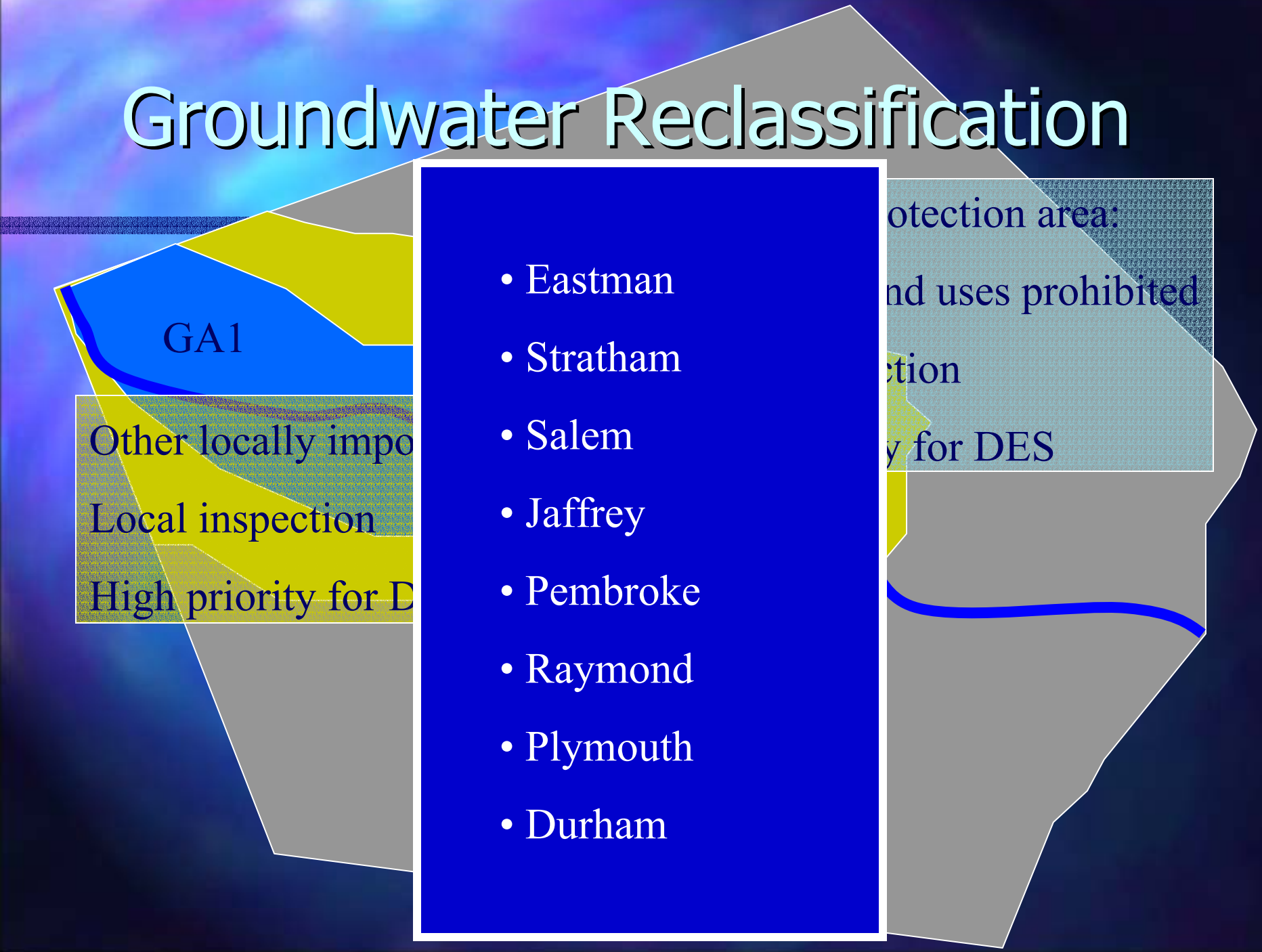
- Local regulations
- Groundwater reclassification (state-local)
- Watershed rules (state-local)



- Zoning
- Subdivision review
- Site plan review
- Health regulations
- Restricts 6 high-risk land uses
- BMP enforcement
- Protected buffers
- Restricts land and water uses


Pennichuck Brook
Round Pond
Pennichuck Pond
Northwest Conservation Lands
Nashua
CRAFTSMAN LN
OLD BOSTON POST RD
NORTHWEST BLVD
GENEVA AV
MEADOW DR
FARLEY RD
BLOODS CROSSING
MASSASOIT RD
BLACK RD
INDIAN ROCK RD
DEERWOOD DR

Groundwater Reclassification



Source Protection Steps

1. Education: why, what, how, who
2. Stakeholder Participation
3. Identify Resources to be Protected
4. Inventory Current and Future Threats
5. Decide on Protection Approaches (Plan)
6. Implementation
7. Education

You Can Do Source Protection

- One size fits most.
- Everyone can be better than average.
- Learn from one another.